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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/682,318	10/09/2003	Hiroaki Arakawa	03617/LH	9828

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EXAMINER	
MARTIN, LAURA E	
ART UNIT	**PAPER NUMBER**
2853	

DATE MAILED: 01/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	10/682,318	ARAKAWA, HIROAKI
	Examiner	Art Unit
	Laura E. Martin	2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _09 November 2005_.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _2-19_ is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☒ Claim(s) _15_ is/are allowed.
6)☒ Claim(s) _2-14 and 16-19_ is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on _09 October 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☒ All b)☐ Some * c)☐ None of:
1.☒ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 19, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) in view of Walker et al. (US 6425650).

DeLacy teaches an inkjet recording apparatus, comprising: a recording head including a plurality of nozzles (figure 4, element 12) aligned in a sub scanning direction; a recording section (column 5, lines 47-51) to record an image on a recording medium (figure 2, element 4) by jetting ink drop lets from the nozzles while moving the recording head in a main scanning direction (column 11, lines 17-19); a mark recording section (column 11, lines 20-22) to record a mark on the recording medium using a predetermined nozzle; a mark detecting unit (figure 4, element 20), a recording medium feeding section (figure 3) to feed the recording medium in the sub-scanning direction; and a control section to control the recording medium feeding section to feed the recording medium for a predetermined distance (column 11, lines 37-39), such that the recording medium feeding section feeds the recording medium until the mark detecting unit detects the mark (column 11, lines 39-41) and then feeds the recording medium for a distance remaining up to the predetermined distance based on a feeding amount by the recording medium feeding section. DeLacy also teaches the mark detecting unit comprising a light reflection type sensor (column 6, lines 66+) which includes: a light emitting element (figure 3, element 31) which emits a detecting light or light beam onto the recording medium (column 6, lines 57-59); a condenser lens which condenses the detecting light or light beam emitted from the light emitting element (column 7, lines 65+); and a light receiving sensor (figure 3, element 33) which detects the light or light beam reflected from a surface of the recording medium on which the detecting light beam is focused by the condenser lens (column 6, lines 57-64), wherein the optical axes of the light emitting element and the condenser lens are slanted with respect to the surface of the recording medium in the main scanning direction (figure 4, elements A and B).

DeLacy does not teach a mark detecting unit mounted on the recording head at a position separated from the predetermined nozzle along the sub-scanning direction, to detect the mark. DeLacy also does not teach the optical axes of the light emitting element and the condenser lens are approximately perpendicular to the surface of the recording medium.

Walker et al. teaches a mark detecting unit mounted on the recording head at a position separated from the predetermined nozzle along the sub-scanning direction, to detect the mark (figure 1, elements 100 and 50-56). Walker et al. also teaches the optical axes of the light emitting element and the condenser lens are approximately perpendicular to the surface (figure 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of DeLacy with the disclosure of Walker et al. in order to improve the quality of the detection device.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Gudaitis et al. (US 6315382).

DeLacy and Walker et al. disclose the invention of claim 19; however, neither disclose a recording medium feeding section that feeds the recording medium at a high speed until the mark is positioned at a position which is adjacent to a position at which the mark will be detected by the mark detecting unit, and then feeds the recording medium at a low speed from the position adjacent to the position at which the mark will be detected.

Gudaitis et al. teaches a recording medium feeding (column 4, lines 27-30) section that feeds the recording medium at a high speed (column 4, line 330-35)) until the mark is positioned at a position which is adjacent to a position at which the mark will be detected by the mark detecting unit (column 4, line 27-30 and figures 5 and 6), and then feeds the recording medium at a low speed from the position adjacent to the position at which the mark will be detected (column 5, line 24-28).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Gudaitis et al. in order to improve the detection accuracy.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Tayuki et al. (US 6412909).

DeLacy and Walker et al. disclose the invention of claim 19; however, neither teach a memory device to store the feeding amount by the recording medium feeding section wherein when the mark detecting unit cannot detect the mark, the recording medium is fed based on a previously stored feeding amount in the memory.

Tayuki et al. teaches a memory device to store the feeding amount by the recording medium feeding section wherein when the mark detecting unit cannot detect the mark, the recording medium is fed based on a previously stored feeding amount in the memory (column 3, lines 8-11).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Tayuki et al. in order to improve printing quality.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Haselby (US 6158344).

DeLacy and Walker et al. teach the inkjet recording apparatus of claim 19; however, neither discloses a feeding distance of the recording medium until the mark detecting unit detects the mark is less than a feeding amount which the recording medium is to be advanced and a feeding amount detecting section which detects the feeding amount by the recording medium feeding section, wherein the recording medium feeding section which switches the inkjet recording apparatus between a mode in which a feeding amount of the recording medium is determined based on a position where the mark detecting unit detects the mark, and a mode in which the feeding amount of the recording medium is determined based on only a detection signal from the feeding amount detecting section.

Haselby teaches a feeding distance of the recording medium until the mark detecting unit detects the mark is less than a feeding amount which the recording medium is to be advanced (Fig 10 illustrates marks that are detected by the optical sensor; the feeding distance to the mark is less than the overall feeding distance of the recording medium) and a feeding amount detecting section (figure 1, element 21) which detects the feeding amount by the recording medium feeding section (column 5, lines 45-46) wherein the recording medium feeding section (figure 1, element 12) which switches the inkjet recording apparatus between a mode in which a feeding amount of the recording medium is determined based on a position where the mark detecting unit detects the mark (column 6, lines 60-65), and a mode in which the feeding amount of the recording medium is determined based on only a detection signal (figure 6, element 76) from the feeding amount detecting section.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Haselby in order to provide a higher level of sensor accuracy.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Taylor (US 6663206).

DeLacy and Walker et al. teach the apparatus of claims 19, and Walker et al. teaches a recording medium detecting section (figure 1, element 100). However, neither DeLacy nor Walker et al. disclose a recording medium detecting section which detects whether or not the recording medium is present based on an output of the mark detecting unit, and a bi-directional position detecting section which performs bi-directional positioning of the recording head with respect to the recording medium based on an output of the mark detecting unit.

Taylor teaches a recording medium detecting section (figure 2, element 35) which detects whether or not the recording medium is present based on an output of the mark detecting unit (column 4, lines 12-17), and a bi-directional position detecting section which performs bi-directional positioning of the recording head with respect to the recording medium based on an output of the mark detecting unit (column 4, lines 36-38).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Taylor in order to improve sensor accuracy.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Salter et al. (US 5777638).

DeLacy and Walker et al. teach the apparatus of claim 19. DeLacy teaches the mark recording device section recording a plurality of marks at a time (column 5, lines 47-51) on the recording medium using a plurality of different nozzles, the mark detecting unit detecting the plurality of marks (column 11, lines 20-22). DeLacy and Walker et al. do not teach the recording medium feeding section calculating and assuming a position which gives the smallest detection error from a distance interval calculated by a nozzle pitch of the recording head, referring to a position of each mark detected by the mark detecting unit, and the feeding amount is determined based on the calculated and assumed position.

Salter et al. teaches the recording medium feeding section calculating and assuming a position which gives a smallest detection error from a distance interval calculated by a nozzle pitch of the recording head, referring to a position of each mark detected by the mark detecting unit, and the feeding amount is determined based on the calculated and assumed position (C7, L25+).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Salter et al. in order to improve printing accuracy.

Claims 8, 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Hanagata et al. (US 4839674).

DeLacy and Walker et al. disclose the invention of claim 19; however, neither teach a mark being printed outside of an image printing area of the recording medium; the mark printed on an area which is upstream in the sub-scanning direction of an area on which the main scanning of the recording head performs the recording; and wherein the mark is a single mark that is printed by one scan and is perpendicular to the sub-scanning direction.

Hanagata et al. teaches a mark being printed outside of an image printing area of the recording medium (figure 4, elements 9-12); the mark printed on an area which is upstream in the sub-scanning direction of an area on which the main scanning of the recording head performs the recording (figure 4, elements 9-12); and wherein the mark is a single mark that is printed by one scan and is perpendicular to the sub-scanning direction (figure 4, each mark is its on entity).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of DeLacy as modified with the disclosure of Hanagata et al. in order to provide a higher quality printed image.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868), Walker et al. (US 6425650), and Hanagata et al. (4839674) in further view of Shimada et al. (US 6547355).

DeLacy, Walker et al., and Hanagata et al. teach the apparatus of claim 9, and Walker et al. discloses a recording head comprising a plurality of heads (figure 1, elements 50-56); however, none of these references disclose a plurality of heads that includes the predetermined nozzle is shifted by one nozzle interval from the other heads in the sub-scanning direction or wherein the mark recording section causes the predetermined nozzle to eject for a distance necessary for printing the mark by changing data corresponding to the predetermined nozzle to one.

Shimada et al. teaches a plurality of heads (figure 3, elements 61-64) that includes the predetermined nozzle is shifted by one nozzle interval from the other heads in the sub-scanning direction or wherein the mark recording section causes the predetermined nozzle to eject for a distance necessary for printing the mark by changing data corresponding to the predetermined nozzle to one (column 15, lines 20-40).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Shimada et al. in order to improve printing quality.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868), Walker et al. (US 6425650), Hanagata et al. (4839674), and Shimada et al. (US 6547355), in further view of Moon et al. (US 2002/0012027).

DeLacy, Walker et al., Hanagata et al., and Shimada et al. teach the invention of claim 10; however, none of these disclosures describe a mark recording section preventing nozzles adjacent to the predetermined nozzle from ejecting ink by controlling the nozzles to be zero filling with ink.

Moon et al. teaches a mark recording section preventing nozzles adjacent to the predetermined nozzle from ejecting ink by controlling the nozzles to be zero filling with ink [0033].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with the disclosure of Moon et al. in order to provide a higher quality print image.

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeLacy (US 4734868) and Walker et al. (US 6425650) in further view of Armijo et al. (US 6,352,331).

DeLacy and Walker et al. teach the apparatus of claim 19. DeLacy teaches a mark (figure 4, element 35) detecting unit (figure 4, element 31) comprising a light emitting element that emits light to the recording medium (figure 4, element 4) and a light detecting element that detects light reflected from the recording medium (figure 4, element 33). Walker et al. teaches the light emitting element comprising a blue LED and the light detecting element is sensitive to blue (column 9, lines 50+). However, none teach a mark being yellow or a mark detecting unit comprising a light emitting element that emits light to the recording medium.

Armijo et al. teaches a yellow recording mark (column 4, line 57).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inventions of DeLacy as modified with that of Armijo et al. in order to provide an unobtrusive detection mark.

Response to Amendment

In light of applicant's cancellation of claim 1, the 35USC 102 rejections of claims 4, 5, and 7 and the 35 USC 103 rejections of claims 2, 3, 6, and 8-18 are hereby withdrawn and thus the applicant's arguments directed thereto are rendered moot.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Martin whose telephone number is (571) 272-2160. The examiner can normally be reached on Monday - Friday, 7:00 - 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Laura E. Martin

1/20/06

MANISH S. SHAH
PRIMARY EXAMINER